XVII.—*On the Structure of the Ovule in Plants.* By M. J. Schleiden, M.D., Professor of Botany in the University of Jena*.

Linnæus established a fixed period for the description of the organs of reproduction; namely, for the floral organs the fully developed flower at the moment of the diffusion of its pollen; for the fruit, on the other hand, the moment of maturity, *i. e.* in general, the natural separation of the fruit from the plant; and in so doing he was perfectly right. Linnæus undoubtedly described well, for what he could not see with the naked eye or with a moderate lens he passed over in silence. But it was soon felt requisite to pay attention to parts not perceptible to the naked eye; and more especially since a preference has been given to the natural arrangement of plants has it been found necessary to take into consideration the structure of the ovule. Now-a-days, indeed, it is pretty generally the case that but few physiological botanists take the trouble to inquire into the structure of the ovule and the development of the seed, and the more systematic botanists borrow their statements upon trust and faith, or without such warrant judge of the structure of the ripe seed, *mutato nomine*, from the ovule†. He, however, who is not totally ignorant of the history of the development of plants knows very well that the gradual changes resulting from progressive development are frequently so considerable, that even the reduction of later stages to the earlier ones which have been actually observed is quite impossible without constantly following the progress of development. Thus it seems singular enough, when describers with an air of great seriousness, as if they had actually observed it with their own eyes, talk for instance of an

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† That frequently accident or fancy have the principal share, is among other things proved by the position of the *Nymphæaceæ* in Kunth's excellent 'Flora Berolinensis,' otherwise entirely arranged from personal and new observations. That in such a work the *Nymphæaceæ* should be classed under Monocotyledons, and indeed, as *Butomeis proxime affines*, and that the researches of Brongniart, Mirbel, Brown, and Lindley should be entirely passed over, is scarcely conceivable.

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But if at last, and indeed with perfect justice, an essential value has been placed on the description of the formation of the ovule, and if we are every day more and more convinced that a plant is not a crystal which can be laid aside today, and ten years afterwards found in the same state, but that engaged in constant, active, and lively development, it sometimes manifests this side of its life, sometimes that, and thus every moment escaping the observer, it nowhere can be conceived as a process terminated in a given moment, but solely as the idea of several stages of development, and as the collective expression of an uninterruptedly continuing process; then indeed it is evident that by the present mode of proceeding science is not much advanced; and that on the one hand, a fixed moment must be established for the description of the structure of the ovule according to Linnæus's notions; but, also, on the other hand, that the progress of development must be indicated, through which apparent differences at certain periods may be reconciled with a higher unity, while apparent resemblances are resolved into their proper members according to the different principles of development. Here again Robert Brown is the name which first trod the right path and indicated what is required of us, although, as in many other cases, without any one making use of or following up his ingenious indications. Robert Brown, struck by the apparent contradiction in finding in the same genus (*Euonymus*) both pendent and erect ovules at the same time, inquired further, and discovered the law, that the *raphe* in the ovule constantly passes along the side directed towards the *placenta*; that in the *ovula pendula* of *Euonymus* this is not the case, but that they become *ovula erecta,* if in imagination we again bring the *raphe* into the right position; that therefore the ovules of this plant are only apparently pendent (pro-

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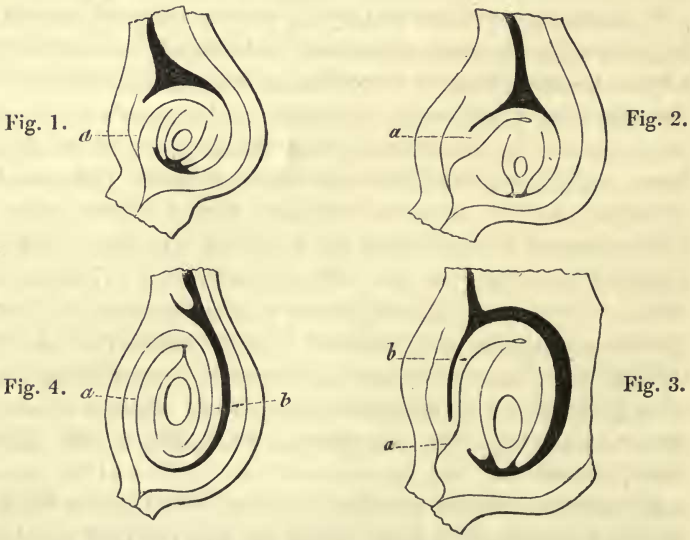

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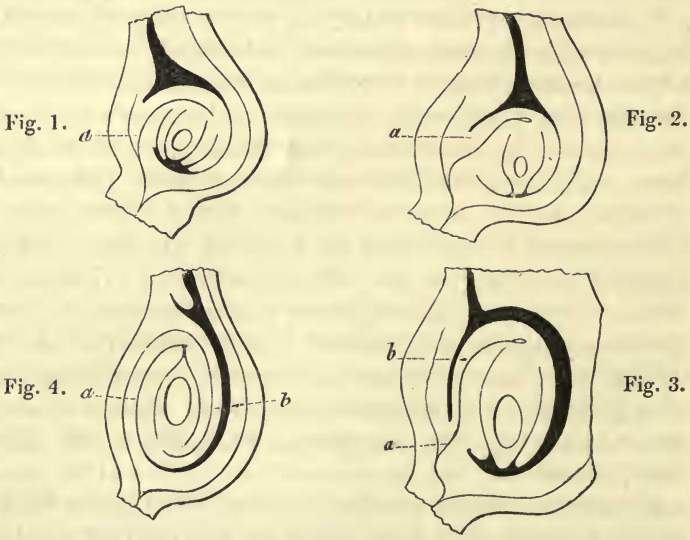

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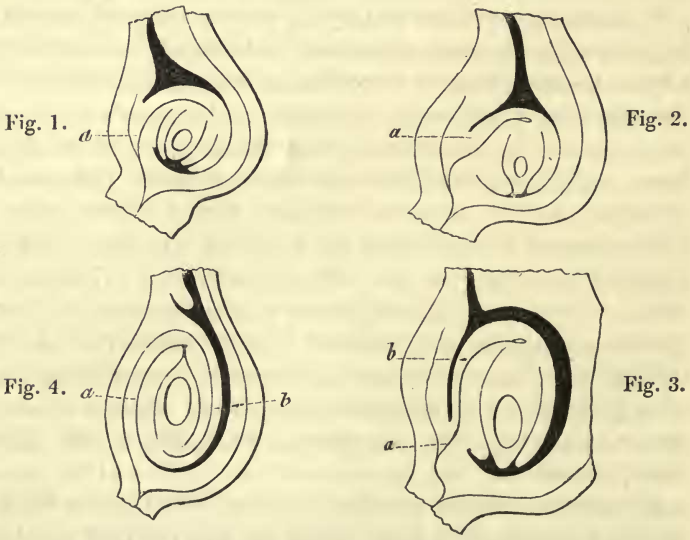

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dually together, that the difference alluded to is absolutely incapable of being employed as a ground of division at the time of flowering; when the seeds are ripe it then indeed affords a well-defined distinctive character. But since we have genera which cannot be divided (*Euonymus*) in which this double form occurs, such a character can in no case be made use of to establish and justify a division, unless nature evidently indicates it otherwise; and indeed the less so, when, as in *Ranunculaceæ*, nature has set no value on the structure itself of the ovule, and when peculiarities otherwise most constant within the limits of family are found to be among the most variable. Of this nature is the number of integuments of the ovule, which in *Ranunculaceæ* vary even in the same genus.

With an *integumentum simplex* there are, *Thalictrum, Anemone, Hepatica, Ranunculus, Ficaria, Caltha, Helleborus, Delphinium tricorne* and *chinense*, and the *Podophylleæ*.

With an *integumentum duplex* there are, *Clematis, Adonis, Trollius, Isopyrum, Aquilegia, Aconitum, Pæonia, Delphinium fissum, elatum, bicolor, consolida, Ajacis*, and the *Magnoliaceæ*.

So great is the difficulty of examining most plants of this family with reference to the original structure of their ovule, which in general is no longer to be recognized even in the developed bud, that I will not assert that some error may not have crept into the preceding enumeration (perhaps in Delphinium). But if, as I trust, the greater part is correct, then the conclusion is justified—that the number of integuments, which is of fixed constancy in most other families, here appears as a totally variable and consequently secondary character, according to which alone the family can neither be restricted nor extended.

An example of similar anomalies also occurs in the family of the *Aroideæ*. Here there is nothing constant in the formation of the ovule, but the *integumentum duplex* pertaining to all Monocotyledons. We find moreover in this family *ovula erecta* (*Arum*), *pendula* (*Pothos*), *atropa* (*Sauromatum*), *hemianatropa* (*Meconostigma*), *anatropa* (*Calla*), and even *hypertropa* (*Orontium aquaticum*). Robert Brown united *Typha-*

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DESCRIPTION OF THE FIGURES.

Fig. 1. *Adonis vernalis.* Longitudinal section of the *ovarium* just before the expansion of the flower.
a. Placenta. In the fully developed flower, the form of the ovulum scarcely changed.

Fig. 2. *Ranunculus repens.* The same.

Fig. 3. *Ranunculus repens.* Just after the expansion of the flower.
a. Placenta;—*b. Raphe.*

Fig. 4. *Anemone nemorosa.* Just after the expansion of the flower.
a. and *b.* As in the preceding figure.

XVIII.—*On the Bone of an unknown Struthious Bird of large Size from New Zealand.* By Richard Owen, Esq., F.R.S.

The bone of an unknown Struthious bird of large size, presumed to be extinct, has been placed by Mr. Rule, in the hands of Professor Owen for examination, with the statement that it was found in New Zealand, where the natives have a tradition that it belonged to a bird of the Eagle kind, but which has become extinct, and to which they give the name "Movie." Similar bones it is said are found buried in the banks of the rivers.

The following is an abstract of Profesor Owen's account of this bone, communicated to the Zoological Society, Nov. 12.

"The fragment is the shaft of a femur, with both extremities broken off. The length of the fragment is six inches, and its smallest circumference is five inches and a half. The exterior surface of the bone is not perfectly smooth, but is sculptured with very shallow reticulate indentations: it also presents several intermuscular ridges. One of these extends down the middle of the anterior surface of the shaft to about one-third from the lower end, where it bifurcates; two

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